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EXAMINER	
BURKHART, ELIZABETH A	
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Please find below and/or attached an Office communication concerning this application or proceeding.

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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/707,469
Filing Date: December 16, 2003
Appellant(s): DAROLIA ET AL.

Domenica N.S. Hartman
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 08/08/2008 appealing from the Office action mailed 10/16/2007.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

US 2002/0172838	RIGNEY et al	11-2002
US 6,492,038	RIGNEY et al	12-2002

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-20, 33, and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rigney et al (US 2002/0172838) in view of Rigney et al ('038).

Rigney et al ('838) discloses a method of depositing a ceramic coating on a substrate wherein the ceramic coating comprises yttrium-stabillized zirconia (YSZ) and a third metal oxide such as lanthana or neodymia in order to reduce the thermal conductivity of the coating [0009]. The ceramic coating is deposited by EBPVD and has a columnar grain structure [0016]. The chamber is backfilled with oxygen. The coating may be deposited by simultaneously evaporating separate ingots of YSZ and metal

oxide. Alternatively, the coating may be deposited by evaporating a single ingot containing YSZ and the metal oxide. Also, the coating may be deposited by evaporating an ingot of YSZ and evaporating a metal source so that the metal source is oxidized in the presence of oxygen to form the third metal oxide [0024].

Rigney et al ('838) does not disclose using a carbide compound as a source for the third metal oxide or that the ceramic coating also comprises carbon, a carbon-containing gas, and/or precipitates of the carbide compound.

Rigney et al ('038) discloses a method of depositing a ceramic coating on a substrate wherein the ceramic coating comprises YSZ and carbide-based precipitates. The coating is deposited by EBPVD and the chamber is backfilled with oxygen. The coating may be deposited by evaporating a single ingot containing YSZ and a carbide (Col. 5, lines 23-60). The carbide-based precipitates allow thinner thermal barrier coatings to be used, which reduces processing and material costs (Col. 3, lines 28-31).

It would have been obvious to one of ordinary skill in the art at the time of invention by applicant to use the carbide compound as suggested by Rigney et al ('038) as the source of the metal oxide of Rigney et al ('838) in order to produce carbide-based precipitates into the thermal barrier coating, which would allow thinner coatings to be used and would reduce processing and material costs.

Regarding Claims 3 and 12, it would have been obvious to use a carbide compound such as LaC_2 and NdC_2 in order to form the metal oxide such as lanthana and neodymia as suggested by Rigney et al ('838).

Regarding Claims 9-12, 18, and 19, it would have been obvious that a carbon-containing gas such as carbon dioxide or carbon monoxide would also be present in said thermal barrier coating because the oxidation of the LaC_2 or NdC_2 to produce lanthana or neodymia would produce byproducts such as a carbon-containing gas and/or carbide-based precipitates depending on the amount of oxygen introduced to the chamber.

Thus, claims 1-20, 33 and 34 would have been obvious within the meaning of 35 USC 103 over the combined teachings of Rigney et al ('838) and Rigney et al ('038).

(10) Response to Argument

Applicant provides separate headings in the arguments section for (1) claims 1-11 and 33 and (2) claims 12-20 and 34. There is only one ground of rejection for claims 1-20, 33, and 34.

Regarding Claims 1-11 and 33

Applicant argues that the prior art of record does not provide any expectation that a metal and carbon could be dissociated from a metal carbide, the former oxidized and the latter forming a gas, free carbon, or a carbide so that an oxide of the metal and a carbon-containing gas, elemental carbon, or a carbide are co-deposited in a coating. Rigney ('038) teaches evaporating YSZ and a metal carbide in the same ingot by electron beam in an oxygen atmosphere (Col. 2, lines 62-63, Col. 5, lines 23-60) and the present invention evaporates YSZ and metal carbide in the same ingot by electron beam in an oxygen atmosphere, wherein the metal carbide is dissociated. Thus, the

electron beam of Rigney ('038) would have been sufficient to dissociate the metal carbide as well. The difference between Rigney (‘038) and the present invention is that the present invention provides a sufficient amount of oxygen to the chamber during evaporation to oxidize the dissociated metal to also co-deposit a metal oxide in the coating. Rigney (‘838) discloses providing a sufficient amount of oxygen to the chamber to oxidize a metal vapor while YSZ is being evaporated in order to co-deposit a metal oxide in the coating to reduce the thermal conductivity ([0009], [0024]). While the references individually do not teach dissociation of a metal carbide followed by the oxidation of the dissociated metal, the combination of Rigney ('038) and Rigney ('838) would reasonably suggest evaporating an ingot containing YSZ and metal carbide by electron beam (sufficient to dissociate metal carbide) to incorporate carbide precipitates into the coating to allow for thinner TBC coatings, wherein a suitable supply of oxygen may be provided which would oxidize dissociated metal vapor to incorporate a metal oxide in the coating to reduce thermal conductivity.

Applicant argues that Rigney (‘038) clearly does not teach the thermodynamic conditions (sufficient oxygen within the vapor cloud) required to intentionally oxidize the metal of the carbide compound and it would have been counterproductive to the very thing Rigney (‘038) desires to deposit: carbide precipitates. Rigney (‘838) provides reasonable motivation for intentionally oxidizing a metal vapor such that a metal oxide is co-deposited as discussed above. This would not have been counterproductive to the desires of Rigney (‘038) because at least a portion of the metal dissociated would have been expected to reform carbide precipitates with the dissociated carbon depending on

the amount of oxygen provided to the chamber, especially since Rigney ('038) discloses that the carbide precipitates may be formed in an oxygen containing atmosphere.

Applicant argues that the problem solved by the present invention (the difficulty of depositing some combinations of oxides) is completely different from that solved by Rigney ('038) and Rigney ('838), wherein the combination of some oxides includes co-deposition of YSZ with oxides such as lanthana and neodymia (Specification [0008]). Rigney ('838) solves this problem since they successfully co-deposit YSZ with oxides such as lanthana and neodymia [0009].

Regarding Claims 12-20 and 34

The arguments above also apply to claims 12-20 and 34. Applicant further argues that neither Rigney ('038) nor Rigney ('838) teaches deposition of a carbon-containing gas (CO) or elemental carbon as presently claimed. Since the electron beam evaporation used in Rigney ('038) would have been suitable to dissociate the metal carbide into a metal and carbon as discussed above and Rigney ('838) provides reasonable motivation for providing a sufficient amount of oxygen to the chamber to oxidize metal vapor to deposit a metal oxide as discussed above, the deposition of a carbon-containing gas (CO) or elemental carbon would have necessarily flowed from their combination because the oxygen provided would have depleted at least a portion of the dissociated metal to form the metal oxide such that all of the dissociated carbon could not have simply reformed with the metal vapor. Thus, at least a portion of the dissociated carbon would have either reacted with oxygen to form a carbon-containing gas (CO) or was co-deposited as elemental carbon.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/Elizabeth A Burkhart/
Examiner, Art Unit 1792

Conferees:

/Timothy H Meeks/

Supervisory Patent Examiner, Art Unit 1792

/Jennifer Michener/

QAS, TC1700